




# MSK US

## Introduction and Fundamentals

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## Traditional US Vs POCUS

POCUS refers to ultrasound provided at point of care by a non-sonographer or non-radiologist

Traditional US	PoCUS
US examination protocol driven	US examination clinically driven
Limited clinical details available to person performing scan	Full clinical details available
Generally conducted in a radiology setting	Performed in the same setting where diagnosis and treatment provided
Performed by radiologist or sonographer	Performed by clinician assessing and treating the patient
Images stored	Images less often stored
Findings, normal and abnormal, compiled in separate report	Findings generally included as part of patient's general clinical record
Operator has extensive training in Ultrasound	Level of training and experience varies

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**Box 1 Knowledge and skills necessary to perform musculoskeletal ultrasonography (MSUS)**

- Sectional anatomy
- US physics and technology
- Joint US scanning method
- US pattern of normal musculoskeletal tissues
- Pathological MSUS findings
- MSUS artefacts
- MSUS diagnostic criteria
- Doppler technique
- Documentation and report of US findings

Iagnocco, A., Naredo, E., & Bijlsma, J. W. (2013). Becoming a musculoskeletal ultrasonographer. *Best Pract Res Clin Rheumatol*, 27(2), 271-281.

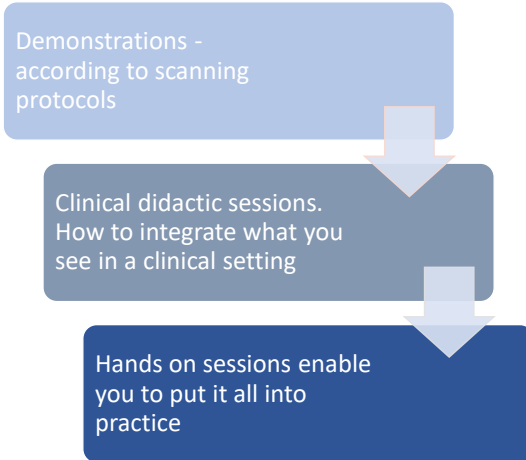
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# The Days Ahead

- Hip
- Knee
- Ankle & Foot
- Needling

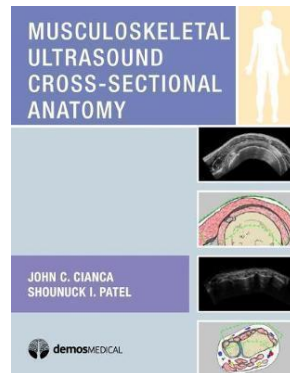
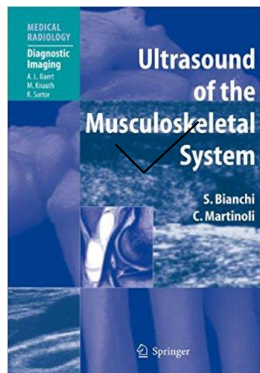
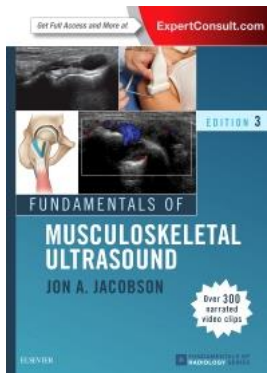


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# (Very) Useful Resources

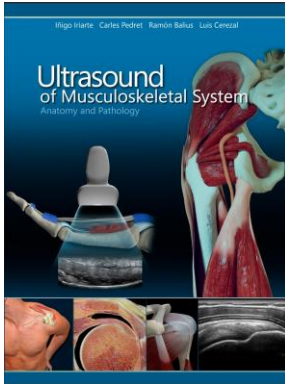


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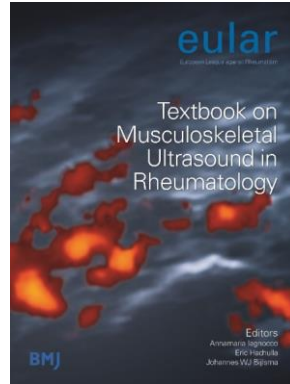


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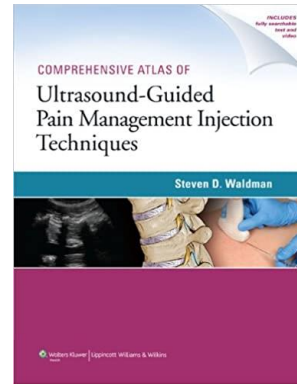
## (Very) Useful Resources



✓✓✓✓✓



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## Online Resources & Apps

EULAR On-line Introductory Ultrasound Course (EULAR School of Rheumatology)  
Runs over several months, 7 modules. Excellent reading (NB you don't need to buy the textbook!) – approx. \$150 AUD

MSK Ultrasound Protocols: <https://essr.org/subcommittees/ultrasound/>  
Free to download, excellent resource

[www.ultrasoundcases.info](http://www.ultrasoundcases.info)

[www.radiopaedia.org](http://www.radiopaedia.org)

[www.theultrasoundsite.co.uk](http://www.theultrasoundsite.co.uk)

[www.mskaustralia.com.au](http://www.mskaustralia.com.au)

[www.birdultrasound.com.au](http://www.birdultrasound.com.au)

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# Online Resources & Apps



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## MSK US CHECKLIST

1. Correlate with history and examination
2. Check Settings
3. Anisotropy (Fan & Heel/Toe)
4. CPD – use it!
5. Gel – make sure you have plenty
6. Transducer Pressure
7. Multiple views
8. Compare opposite side
9. Is there a rheumatological diagnosis?

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# MSK US Lower Limb – a Primer

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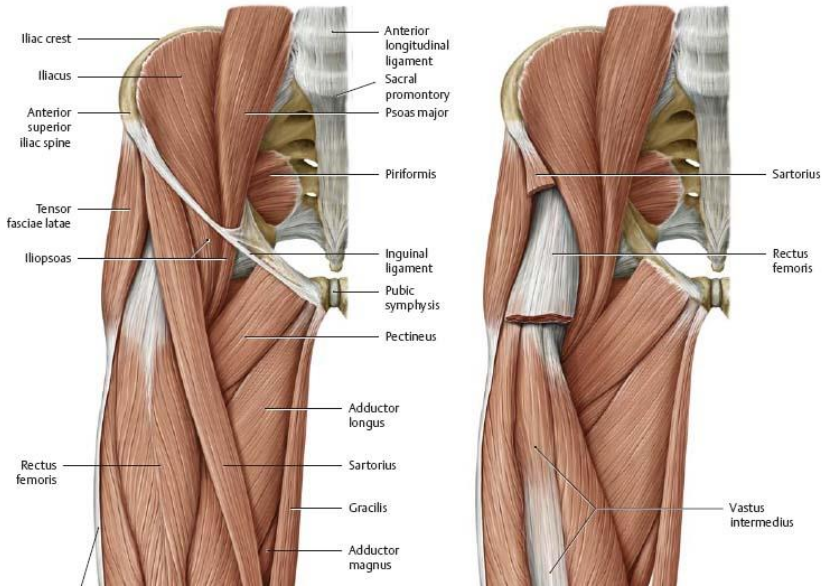


# Hip

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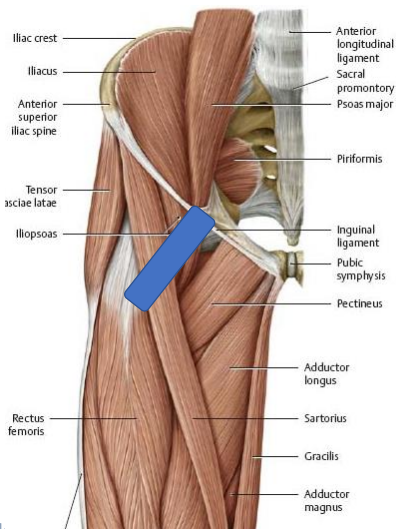
Anterior hip - Muscles

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Anterior recess of the hip >7mm = effusion



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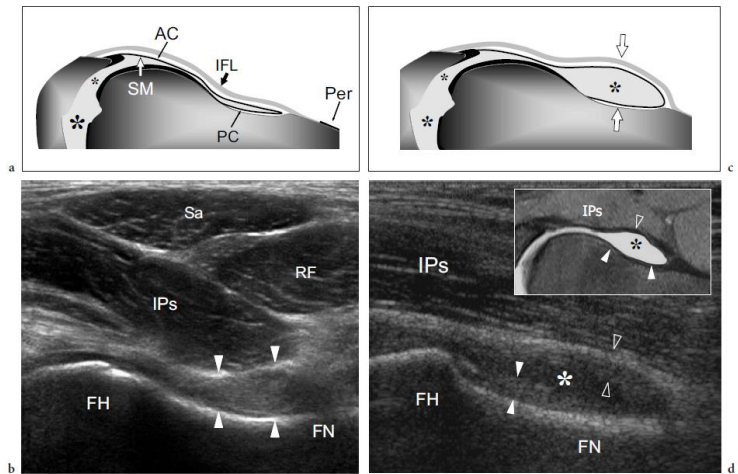
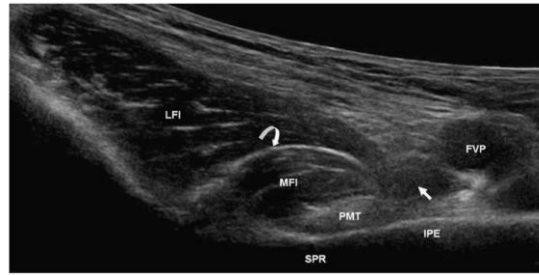
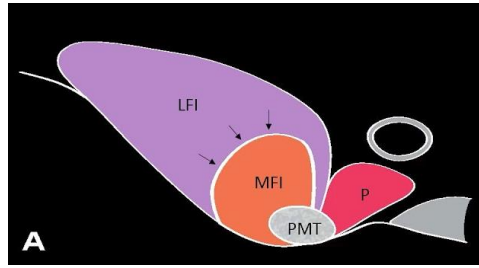
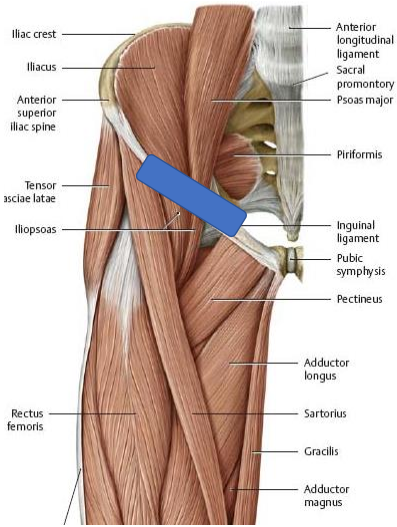


Fig. 12.12a-d. Anterior recess of the hip joint. a,b Transverse oblique 12-5 MHz US images with c,d schematic drawing correlation obtained over the hip joint in a healthy subject (a,c) and in a patient with intra-articular effusion (b,d). In a,c the hypoechoic band of tissue (arrowheads) found between the anterior bony cortex of the femoral neck (AC) and the deep boundary of the iliopectus muscle (IPs) is related to the sum of the iliofemoral ligament (IFL), the anterior (AC) and posterior (PC) joint capsule and the synovial membrane (SM). Per, periosteum. b,d An intra-articular effusion (asterisk) distends the anterior synovial recess and allows differentiation of two distinct capsular layers (arrowheads). Note that the anterior layer (open arrowheads) is thicker than the deep one (white arrowheads) because of the presence of the iliofemoral ligament. RF, rectus femoris; Sa, sartorius; IPs, iliopectus; FH, femoral head. In the insert shown in d, an axial oblique fat-suppressed T1-weighted MR-arthrographic image demonstrates the capsular layers (arrowheads) as hypointense linear bands separated by the joint recess (asterisk) filled with gadolinium contrast

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LFI – lateral fibres iliacus MFI Medial fibres iliacus PMT – Psoas muscle tendon IPE – iliopectineal eminence White arrow – psoas muscle

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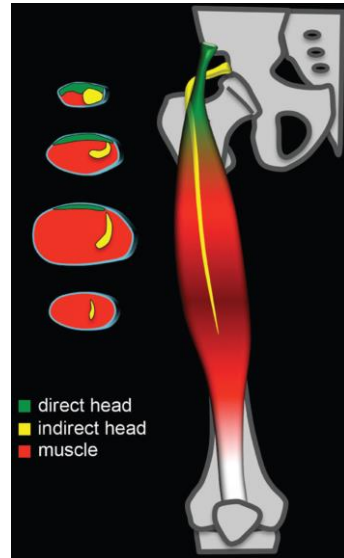
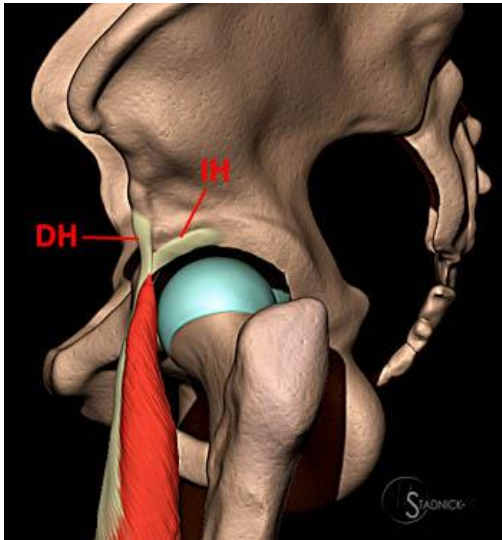


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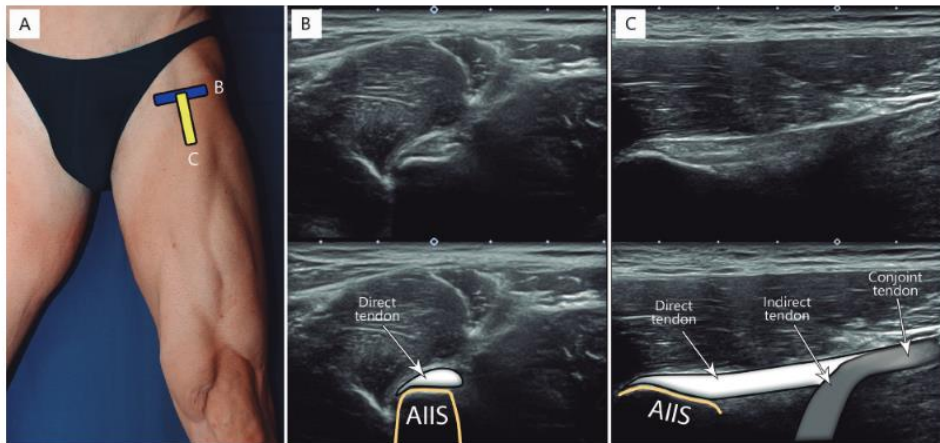




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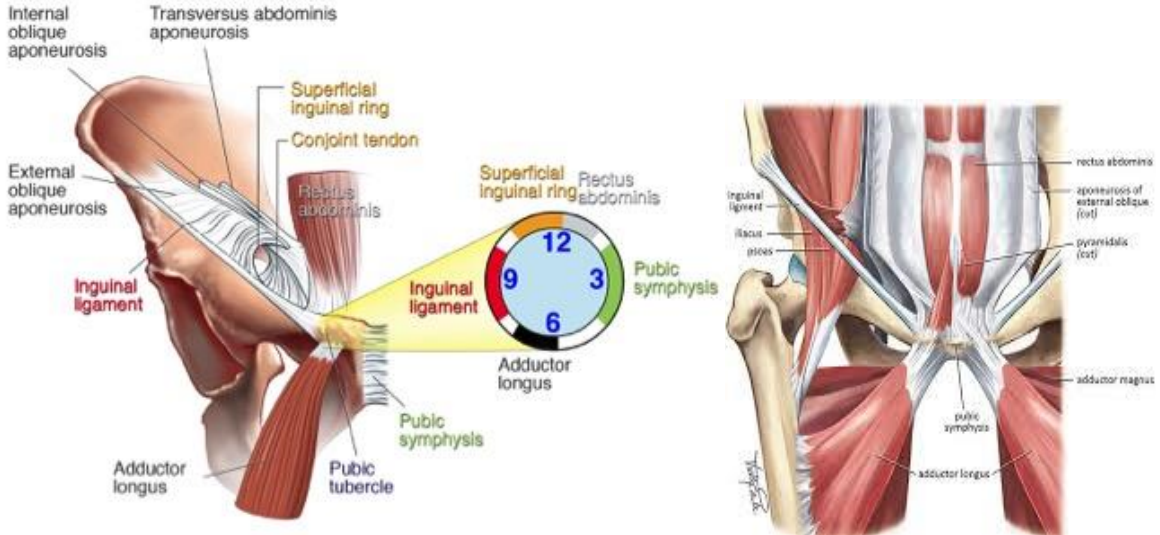


**Figure 13-11.** Ultrasound scan of the anterior inferior iliac spine (AIIS). (A) Probe positions. (B) Short axis: the insertion of the rectus femoris direct tendon can be observed. (C) Long axis: the direct and indirect tendons are shown.

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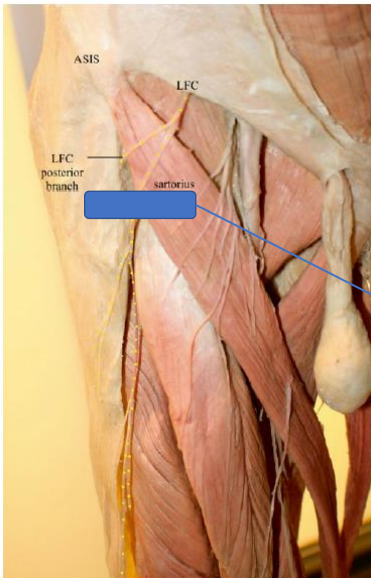


Convergence of structures at the pubis

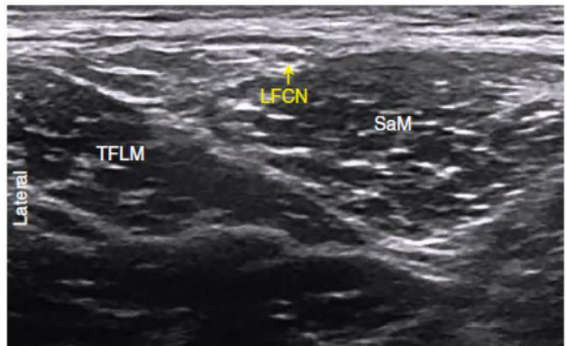
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Meralgia Parasthetica (LFCN Entrapment)

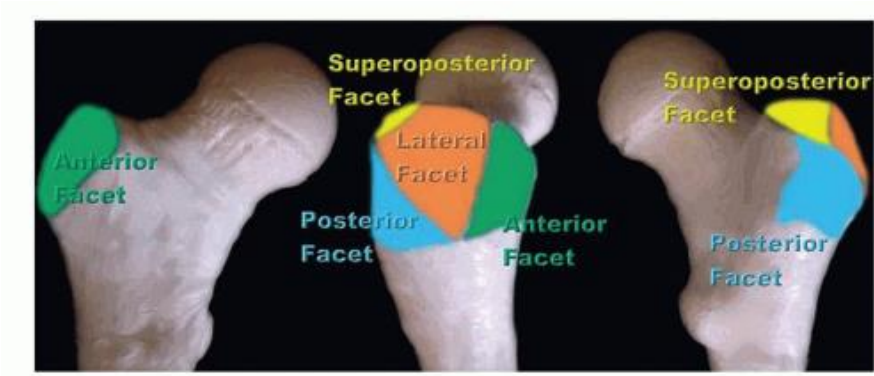


Dias Filho, L. C., Valença, M. M., Guimarães Filho, F. A. V., Medeiros, R. C., Silva, R. A. M., Morais, M. G. V., ... & Franca, S. M. L. (2003). Lateral femoral cutaneous neuralgia: an anatomical insight. *Clinical Anatomy*, 16(4), 309-316.

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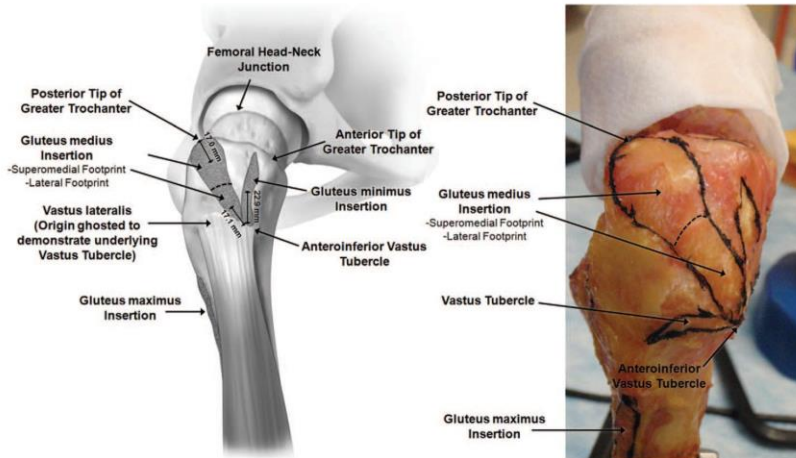


Facets of the greater trochanter

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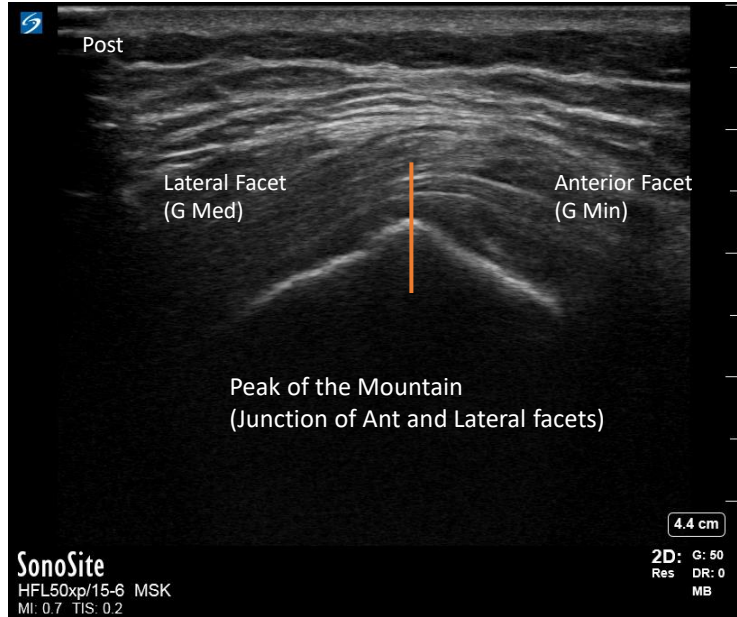
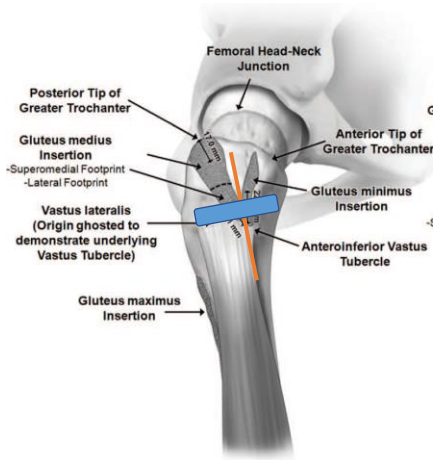


**Figure 5.** (Left) Illustration and (right) photograph of lateral view of a right hip looking medially at the footprint insertions of the greater trochanter. The footprints of the gluteus medius, gluteus minimus, and vastus lateralis with respect to the vastus tubercle are depicted.

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1 o'clock to the femur -  
Glut Minimus long



Glut Minimus short



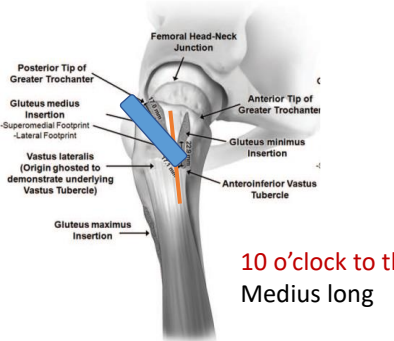
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SonoSite  
HFL50xp/15-6 MSK  
MI: 0.6 TIS: 0.2

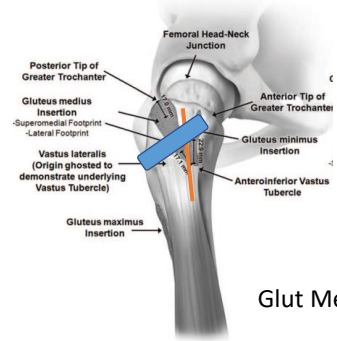


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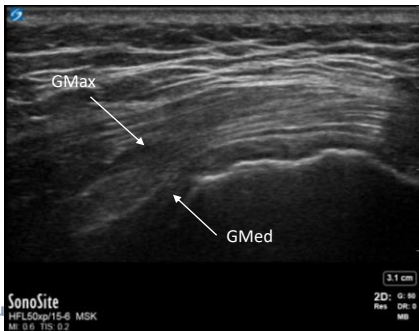




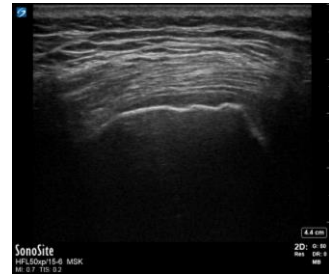
10 o'clock to the femur - Glut Medius long



Glut Medius short

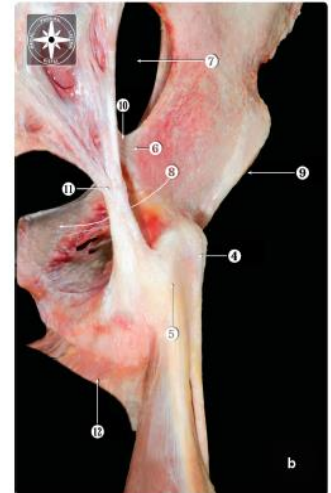
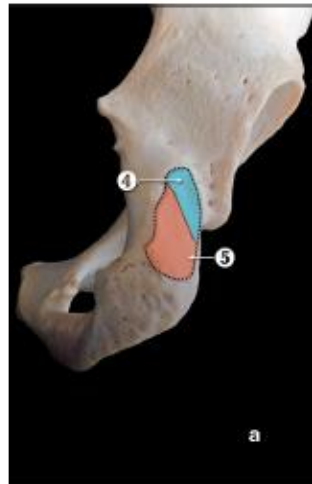
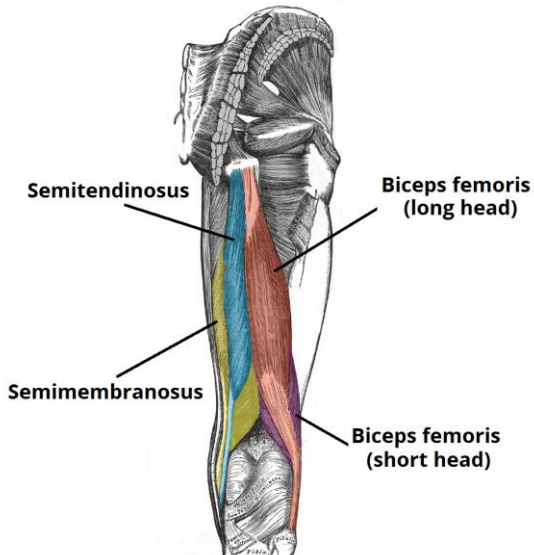


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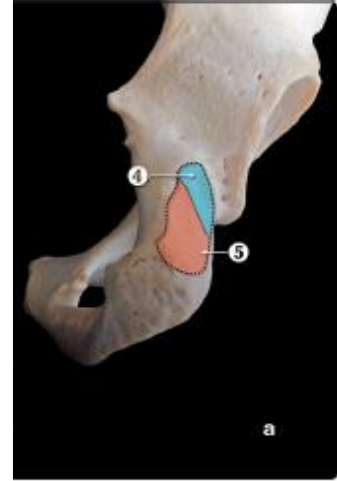
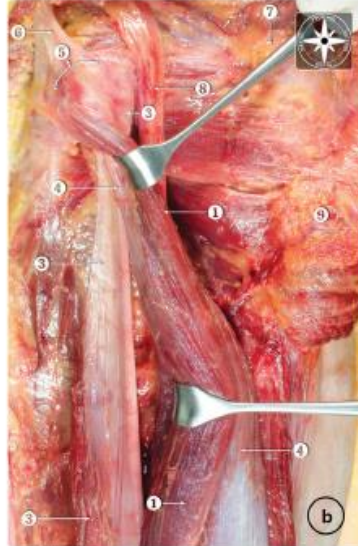
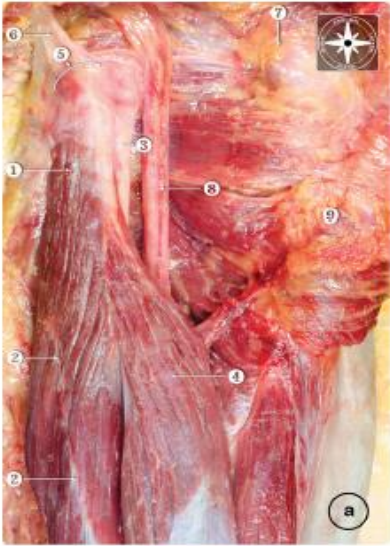


Hamstring origin – semimembranosus is medial in the thigh, but as it ascends it travels beneath ST and BF to insert laterally at the IT

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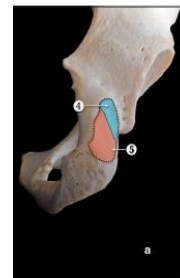
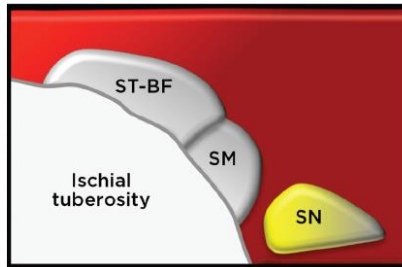
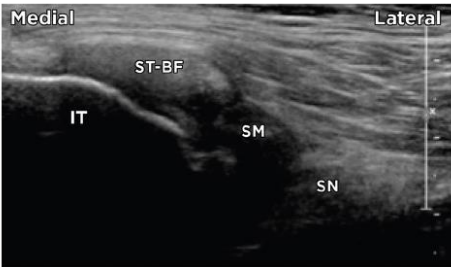


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Hamstring origin – semimembranosus is medial in the thigh, but as it ascends it travels beneath ST and BF to insert laterally at the IT



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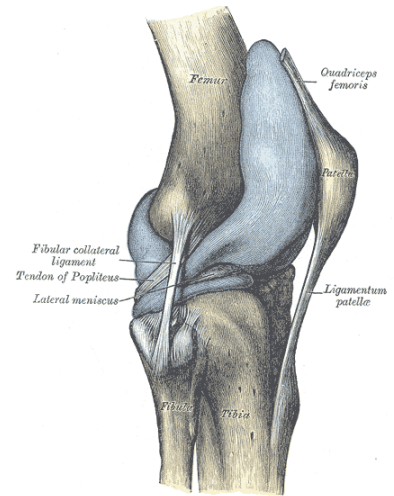
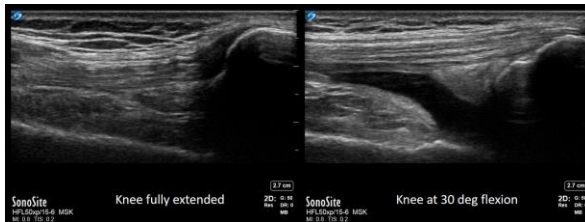
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# Knee

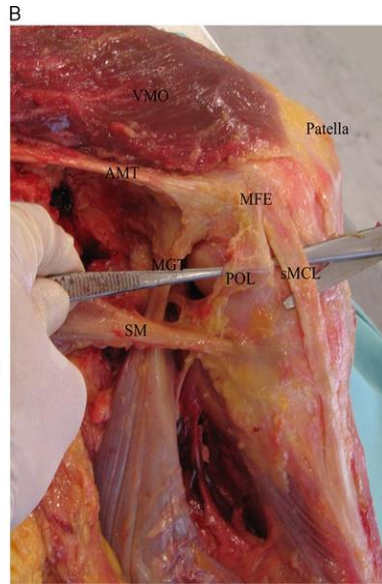
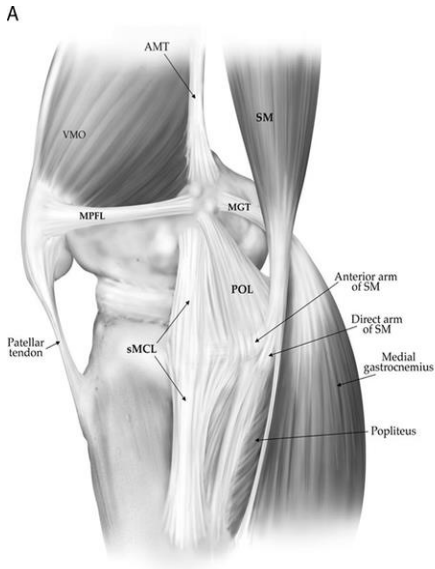
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## Effusion



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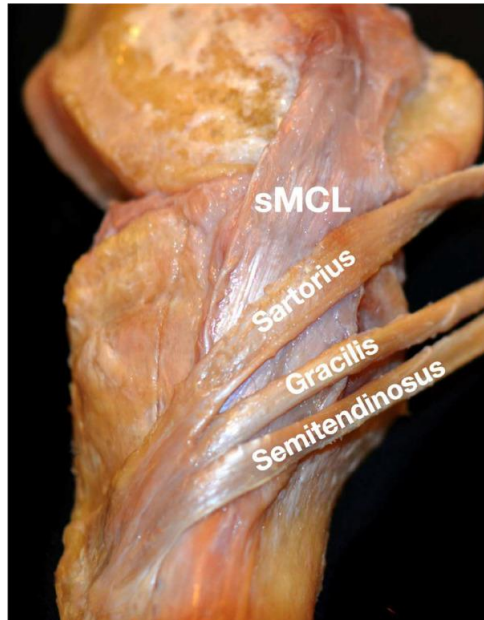




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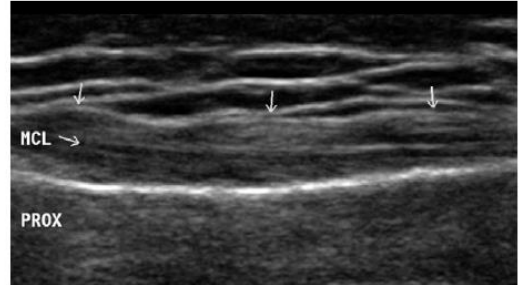
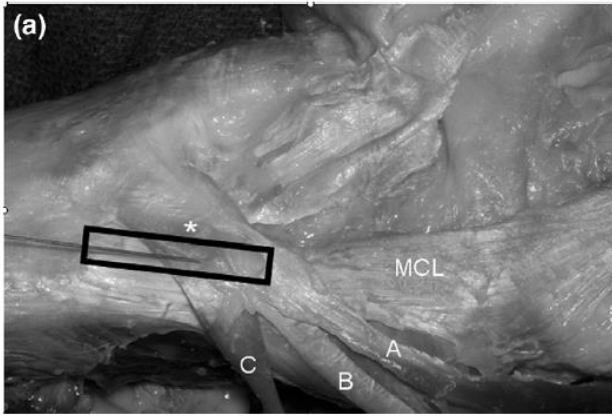


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## Pes anserinus bursitis

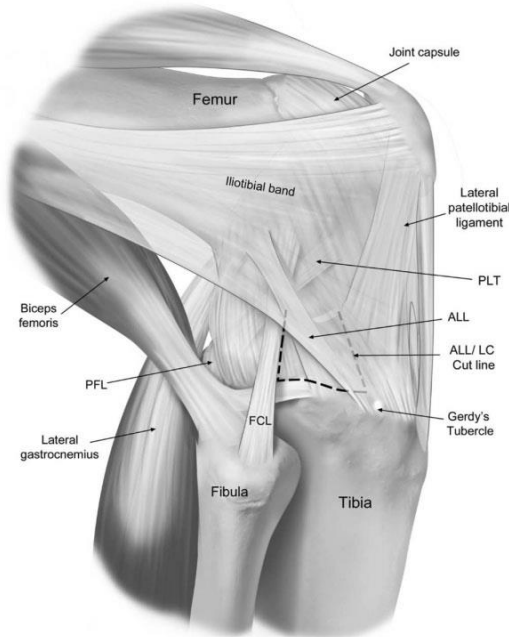


**Figure 2.** Ultrasound image over the anterior fibers of the medial collateral ligament (MCL with horizontal arrow) and pes anserinus (3 downward pointing arrows). The pes anserinus bursa is located in the potential space between the MCL and pes anserinus. Left = proximal; right = distal; top = superficial; bottom = deep.

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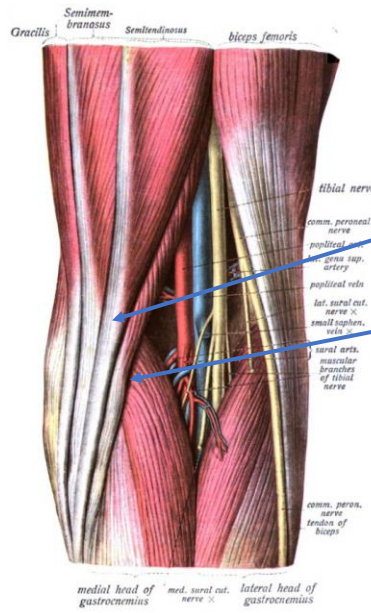
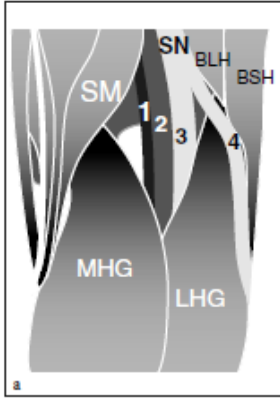
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Popliteal region

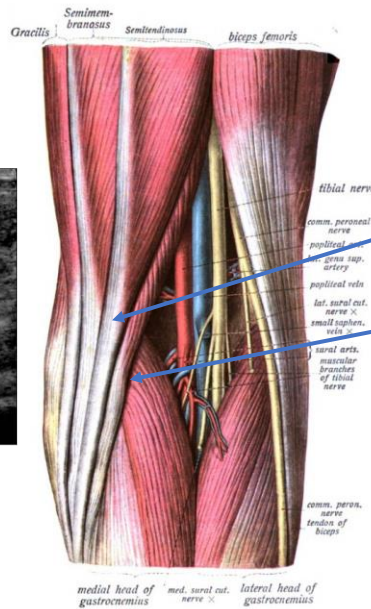
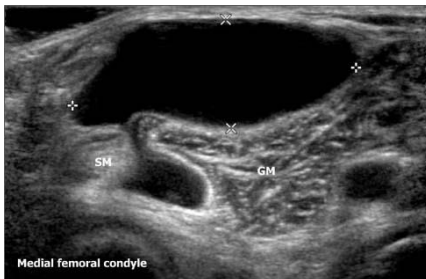
Note ST tendon on top of SM (in transverse is the 'cherry on the top')

Baker's cysts emerge between SM and MG



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Popliteal region

Note ST tendon on top of SM (in transverse is the 'cherry on the top')

Baker's cysts emerge between SM and MG



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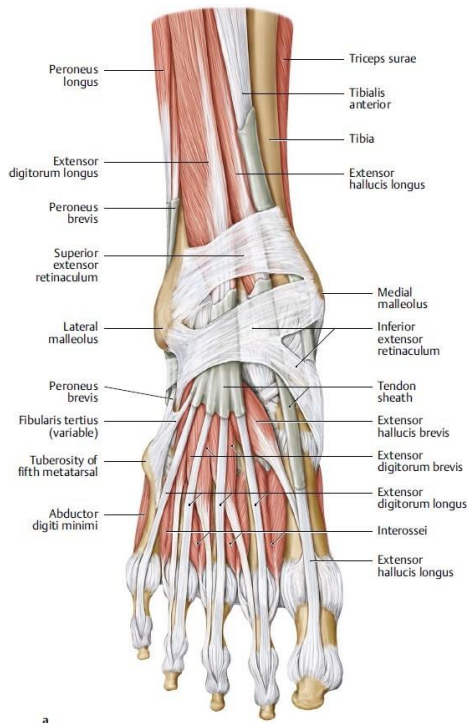


# Ankle and Foot

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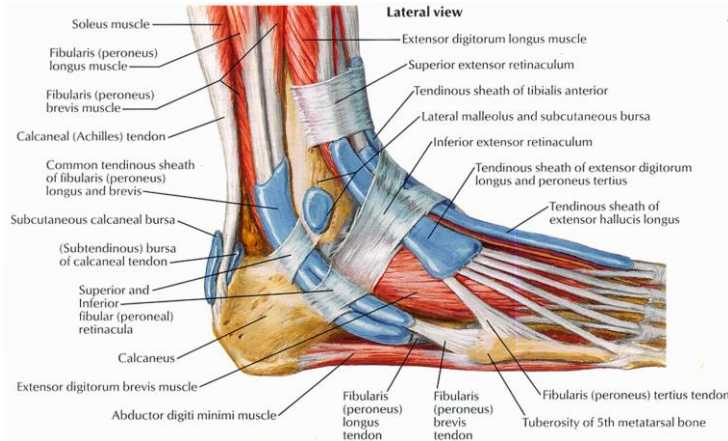


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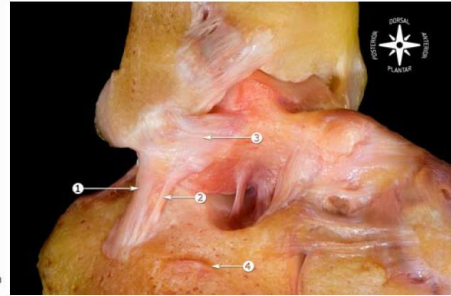
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# Lateral Ankle



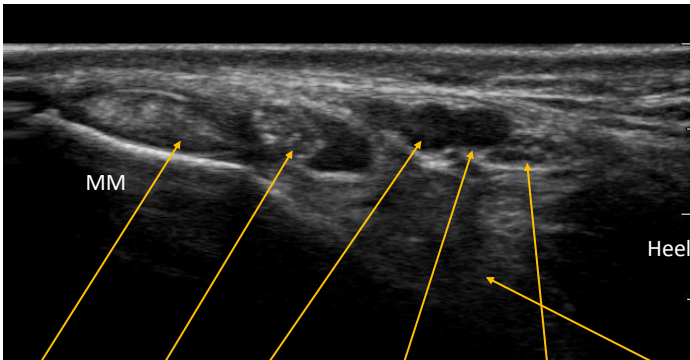
Lateral ankle – note the ATFL travels anteriorly, and medially from the distal fibula, meaning transducer orientation needs to be oblique



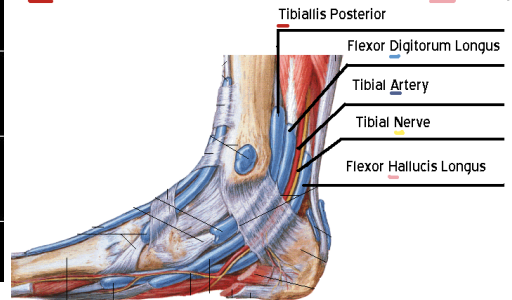
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Tom, Dick, And Nervous Harry



Tom: Tibialis Posterior  
 Dick: FDL  
 And: Post tibial artery  
 Very: Post tibial vein  
 Nervous: Post tibial nerve  
 Harry: FHL

# Medial Ankle

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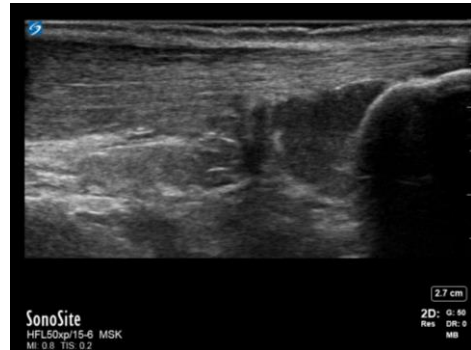
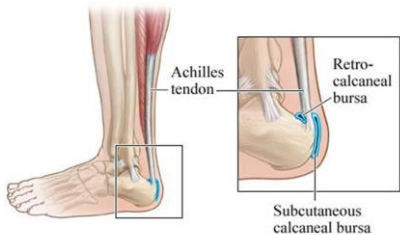


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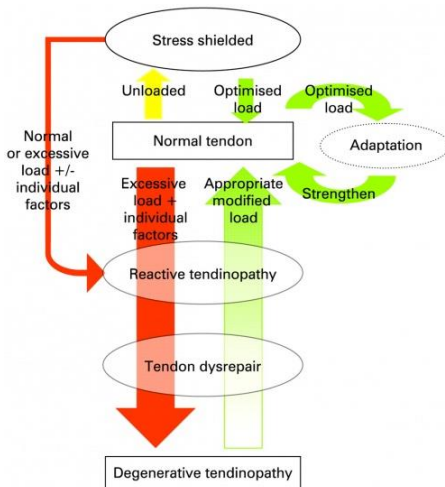
## Achilles tendinosis & retrocalcaneal bursitis



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## Can sonographic appearance of the tendon guide management?

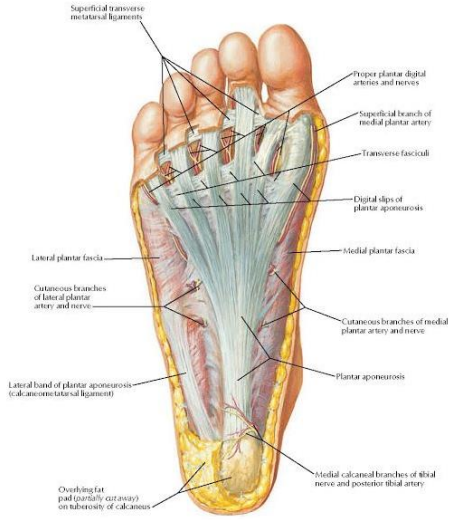
Cook, J. L., & Purdam, C. R. (2009). Is tendon pathology a continuum? A pathology model to explain the clinical presentation of load-induced tendinopathy. *British journal of sports medicine*, 43(6), 409-416.

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# Plantar Fascia

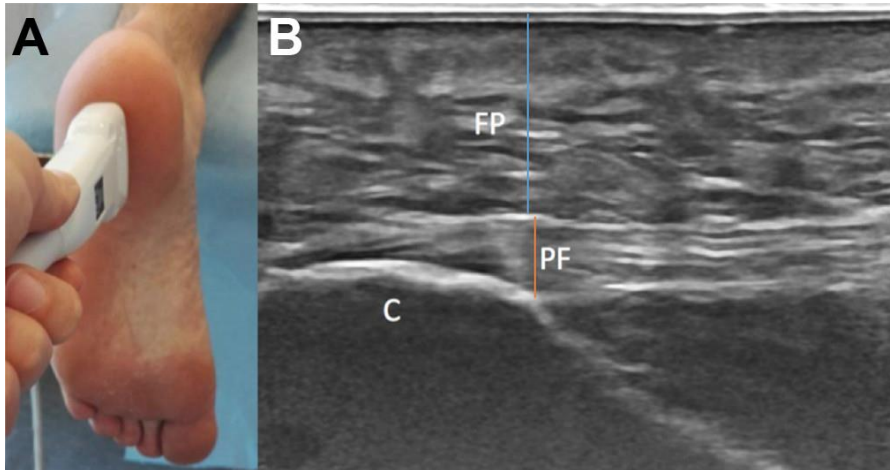


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# Plantar Fascia



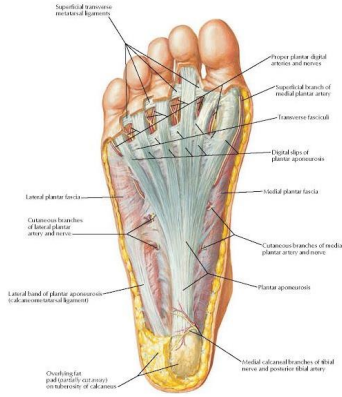
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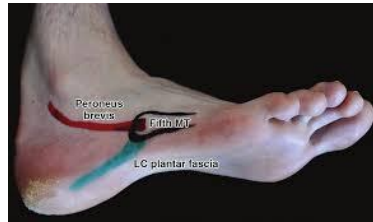
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## Lateral Band of the Plantar Fascia



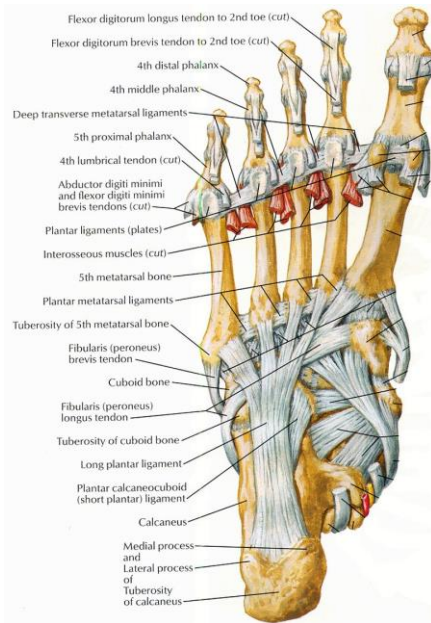
- Inserts on underside of base of 5MT
- Insertional enthesopathy gives rise to pain at base of 5MT
- Can be confused with PB insertional tendinopathy



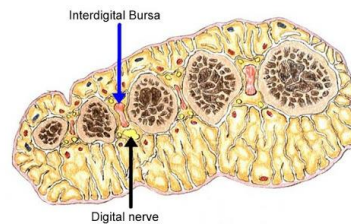
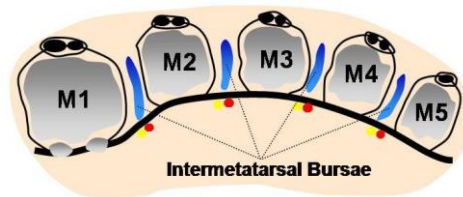
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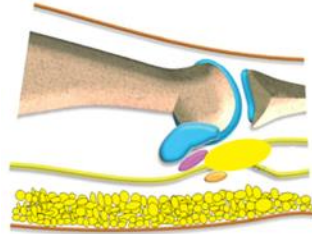
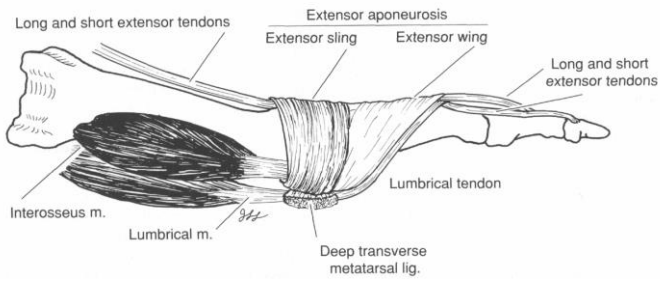
## METATARSALGIA



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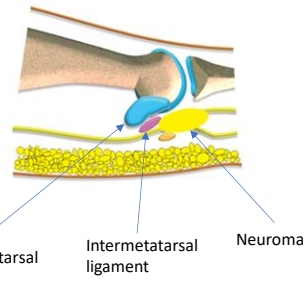
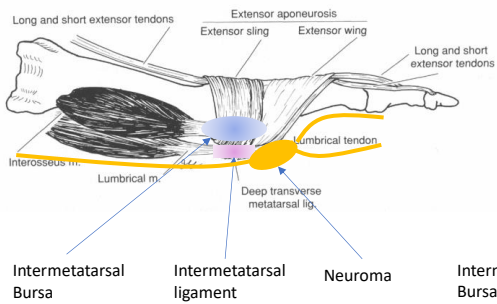
48



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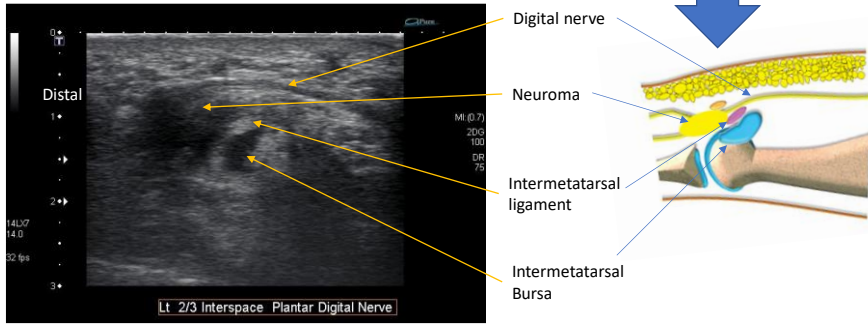


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### Plantar View



The End